

# PATENT SPECIFICATION

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## (54) LIQUID COOLANT COMPOSITION

(71) We, UNITED LUBRICANTS LIMITED, a British Company, of Station House, Harrow Road, Wembley, Middlesex, HA9 6DE, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to liquid coolant compositions for internal combustion engines, particularly for use in the cooling systems of liquid-cooled vehicle engines.

According to the invention we provide a liquid coolant composition comprising, by weight,

- |  |       |    |         |
|--|-------|----|---------|
| (1) ethanediol   | 10    | to | 58%,    |
| (2) sodium benzoate  | 0.85  | to | 2.0%,   |
| (3) sodium tetraborate   | 0.15  | to | 0.35%,  |
| (4) sodium nitrite   | 0.075 | to | 0.21%,  |
| (5) 5,5'-dichloro-2,2'-dihydroxy-diphenyl-methane (Dichlorophen) | 0.05  | to | 0.06%,  |
| (6) benzotriazole  | 0.03  | to | 0.05%,  |
| (7) 30% aqueous emulsion of poly dimethyl siloxane               | 0.003 | to | 0.005%, |
| (8) phenol sulphone phthalein                                    | 0.003 | to | 0.005%, |
| the balance being deionised water.                               |       |    |         |

It should be understood that the liquid coolant composition is used as such in the cooling system and is not intended to be further diluted for use.

The ethanediol is preferably in accordance with B.S. 2537.

Of the constituents of the composition according to the invention, constituent (1) provides the preponderant freezing point depression effect; constituents (2) and (4) contribute to this effect to some degree, but their principal function is to inhibit corrosion of ferrous metal parts with which the coolant is in contact; constituent (3) acts as a buffer to give reserve alkalinity; constituent (5) is a bactericide which counteracts any

tendency there may be for bacterial and/or fungal growth within the composition; constituent (6) is a copper complexing agent which reacts with copper to form an insoluble coating, this in turn countering the corrosive effects of traces of copper on aluminium alloy parts, thus inhibiting corrosion of both aluminium and copper parts with which the coolant is in contact; constituent (7) is an anti-foam agent; and constituent (8) is an indicator.

The indicator, by change of colour from cherry red to yellow at pH 6.8 to 6.9 shows that the coolant has become acid; the normal pH of the coolant being about 7.8. The main cause for the coolant to become acid is the presence of combustion gases, indicating a leaking gasket or metal porosity. The pH of the coolant may be restored by the addition of fresh coolant, to the cooling system. However, should the acidity continue to show by further colour change, a proper investigation for the basic cause should be made. Phenol sulphonate phthalein is the most suitable indicator because of its pH range, 6.8 to 8.4, and because it has a  $pK_{IX}$  of 7.9.

The particular coolant composition used will depend upon the freezing point depression required. The following Table shows the relationship between the ethanediol content of the composition and its approximate freezing point.

Ethanediol Content (% by weight)	Freezing Point (°C)
58	-48
50	-36
40	-24
30	-15
27	-13
20	- 8
10	- 3

In order that the invention be more fully understood, the following Example is given by way of illustration only. All percentages are by weight.

5                      Example.

A liquid coolant having the following composition was prepared:

	%
ethanediol BS. 2537	27
10 sodium benzoate	1.5
sodium tetraborate	0.25
sodium nitrite	0.19
dihlorophen	0.055
15 benzotriazole	0.04
30% aqueous emulsion of	
poly dimethyl siloxane	0.004
phenol sulphone phthalein	0.004
deionised water	70.957
	100.000

20 This coolant composition was found to give all-the-year-round protection to the cooling systems of liquid-cooled vehicle engines.

The composition according to the invention may be used in any system where anti-corrosive, freezing-point depressant and bactericidal activities are desirable and/or necessary for

efficient operation of the system during all seasons.

WHAT WE CLAIM IS:—

1. A liquid coolant composition for internal combustion engines, which comprises, by weight:

ethanediol	10	to	58%	
sodium benzoate	0.85	to	2.0%	
sodium tetraborate	0.15	to	0.35%	35
sodium nitrite	0.075	to	0.21%	
5,5'-dichloro-2,2'-dihydroxy-diphenyl-				
methane	0.05	to	0.06%	
benzotriazole	0.03	to	0.05%	40
30% aqueous emulsion of poly dimethyl				
siloxane	0.003	to	0.005%	
phenol sulphone				
phthalein	0.003	to	0.005%	45
the balance being deionised water.				

2. A liquid coolant composition substantially as herein described in the Example.

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